

1 **CLAIMS**

2       1.     A method, comprising:  
3       connecting to a server to receive streaming content at a first rate;  
4       receiving a portion of the streaming content at the first rate;  
5       requesting the server to send a particular amount of future streaming  
6 content at a second rate;  
7       receiving the particular amount of future streaming content at an actual rate  
8 that is greater than the first rate and less than or equal to the second rate;  
9       determining if the actual rate is viable for receiving the streaming content;  
10      and  
11      if the actual rate is viable for receiving the streaming content, requesting the  
12 server to send remaining streaming content at a rate that is not greater than the  
13 actual rate.

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15       2.     The method as recited in claim 1, further comprising receiving the  
16 remaining streaming content at the first rate if the actual rate is not viable for  
17 receiving the streaming content.

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19       3.     The method as recited in claim 1, further comprising specifying the  
20 first rate.

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22       4.     The method as recited in claim 1, further comprising determining the  
23 first rate from a history file that identifies at least one previous rate of connection  
24 with the server.  
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1           5.     The method as recited in claim 4, wherein the determining the first  
2 rate from a history file further comprises taking a median rate from one or more  
3 rates stored in the history file.

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5           6.     The method as recited in claim 1, further comprising calculating  
6 available connection bandwidth to determine the first rate.

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8           7.     The method as recited in claim 1, wherein the particular amount of  
9 future streaming content further comprises a certain number of seconds of  
10 streaming content data.

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12           8.     The method as recited in claim 1, wherein the particular amount of  
13 future streaming content further comprises a certain number of data packets of  
14 streaming content data.

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16           9.     The method as recited in claim 1, wherein the particular amount of  
17 future streaming content further comprises a certain number of bytes of streaming  
18 content data.

19  
20           10.    The method as recited in claim 1, wherein the receiving the  
21 particular amount of future streaming content at the actual rate further comprises  
22 detecting an indication of when the particular amount of future streaming data  
23 begins.

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1           11.    The method as recited in claim 10, wherein the indication of when  
2 the particular amount of future streaming data begins comprises a time stamp.

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4           12.    The method as recited in claim 10, further comprising detecting an  
5 indication of when the particular amount of future streaming data ends.

6  
7           13.    The method as recited in claim 12, wherein the indication of when  
8 the particular amount of future streaming data ends further comprises a certain  
9 number of data packets of streaming content data received.

10  
11           14.    The method as recited in claim 12, wherein:  
12           the indication of when the particular amount of future streaming data  
13 begins further comprises a sequence number of a first data packet of the future  
14 streaming data; and

15           the indication of when the particular amount of future streaming data ends  
16 further comprises a sequence number of a last data packet of the future streaming  
17 data.

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19           15.    The method as recited in claim 1, further comprising using at least  
20 some of the particular amount of future streaming content received at the actual  
21 rate to increase content stored in a content buffer.

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23           16.    A method, comprising:  
24           receiving a request from a client to stream content to the client at a first  
25 transmission rate;

1 streaming content to the client at the first transmission rate;  
2 receiving a request from the client to increase the streaming to a second  
3 transmission rate for a specified amount of content data;  
4 streaming the specified amount of content data to the client at the second  
5 transmission rate; and  
6 resuming streaming content to the client at the first transmission rate.

7  
8 **17.** The method as recited in claim 16, further comprising providing an  
9 indication to the client of when the content streamed at the second transmission  
10 rate begins.

11  
12 **18.** The method as recited in claim 17, wherein the providing an  
13 indication further comprises flagging a first data packet transmitted at the second  
14 transmission rate.

15  
16 **19.** The method as recited in claim 17, further comprising providing an  
17 indication to the client of when the content streamed at the second transmission  
18 rate concludes.

19  
20 **20.** The method as recited in claim 16, wherein the specified amount of  
21 content data to be transmitted at the second transmission rate is identified as a  
22 number of seconds of content data.

1           **21.**     The method as recited in claim 16, wherein the specified amount of  
2 content data to be transmitted at the second transmission rate is identified as a  
3 number of data packets.

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5           **22.**     The method as recited in claim 16, wherein the specified amount of  
6 content data to be transmitted at the second transmission rate is identified as a  
7 number of bytes of content data.

8  
9           **23.**     The method as recited in claim 16, further comprising:  
10 receiving a request to stream remaining content at the second transmission  
11 rate; and  
12 transmitting remaining streaming content at the second transmission rate.

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14           **24.**     A system, comprising:  
15 an interface to a network that provides at least a connection to a server;  
16 a control module configured to receive streaming content from the server at  
17 a first streaming rate and request the server to modify the first streaming rate to a  
18 second streaming rate for a specified amount of streaming content data;

19 a bandwidth measurement module configured to determine an actual  
20 streaming rate resulting from the request to modify the first streaming rate to the  
21 second streaming rate, and to determine the adequacy of the streaming at the  
22 actual streaming rate; and

23 wherein the control module is further configured to request the server to  
24 stream remaining streaming content at a rate that is not greater than the actual  
25

1 streaming rate if the bandwidth measurement module determines that the actual  
2 streaming rate is adequate for streaming the remaining streaming content.

3  
4 **25.** The system as recited in claim 24, wherein the second streaming rate  
5 is higher than the first streaming rate.

6  
7 **26.** The system as recited in claim 24, further comprising a history list  
8 that contains at least one streaming rate at which the server has adequately  
9 streamed content to the client.

10  
11 **27.** The system as recited in claim 26, wherein the control module is  
12 further configured to derive the first streaming rate from the history list.

13  
14 **28.** The system as recited in claim 26, wherein the control module is  
15 further configured to store the actual streaming rate in the history list.

16  
17 **29.** The system as recited in claim 24, wherein the specified amount of  
18 streaming content data is denoted as a particular number of seconds of streaming  
19 content data.

20  
21 **30.** The system as recited in claim 24, wherein the specified amount of  
22 streaming content data is denoted as a particular number of bytes of streaming  
23 content data.

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1           **31.**    The system as recited in claim 24, wherein the specified amount of  
2 streaming content data is denoted as a particular number of data packets of  
3 streaming content data.

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5           **32.**    The system as recited in claim 24, wherein the bandwidth  
6 measurement module determines the adequacy of the streaming at the actual  
7 streaming rate while content is being streamed to the client over the network at the  
8 actual streaming rate.

9  
10          **33.**    A system, comprising:  
11           a network interface configured to provide at least a connection to a client  
12 over a network;  
13           one or more multi-bitrate files that store two or more versions of streaming  
14 content, each version being configured for transmission at a different streaming  
15 rate; and  
16           a control module configured to identify a request from the client to modify  
17 a first streaming rate at which a version of the streaming content stored in a multi-  
18 bitrate file is being transmitted to the client to a second streaming rate for a limited  
19 amount of streaming content data.

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21          **34.**    The system as recited in claim 33, wherein the control module is  
22 further configured to identify streaming content data transmitted to the client at the  
23 second streaming rate.

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1           35.    The system as recited in claim 34, wherein the control module is  
2 further configured to identify the streaming content data transmitted at the second  
3 streaming rate by flagging one or more data packets included in the streaming  
4 content data transmitted at the second streaming rate as being data packets sent at  
5 the second streaming rate.

6  
7           36.    The system as recited in claim 33, wherein the limited amount of  
8 streaming content data is identified as a particular number of seconds of streaming  
9 content data.

10  
11          37.    The system as recited in claim 33, wherein the control module is  
12 further configured to identify a request from the client to transmit streaming  
13 content remaining after the limited amount of streaming content data has been  
14 streamed at the second streaming rate.

15  
16          38.    One or more computer-readable media containing computer-  
17 executable instructions that, when executed on a computer, perform the following  
18 steps:

19           requesting a server to transmit content file data over a network at a first  
20 transmission rate;

21           while receiving a portion of the content file data at the first transmission  
22 rate, requesting the server to transmit a limited portion of the content file data over  
23 the network at a second transmission rate;

24           receiving the limited portion of the content file data from the server at an  
25 actual transmission rate which is less than or equal to the second transmission rate;



1 determining if the network can viably support transmission of the content  
2 file data at the actual transmission rate;

3 if the network can viably support transmission of the content data at the  
4 actual transmission rate, requesting the server to transmit subsequent content file  
5 data at a rate that is not greater than the actual transmission rate;

6 if the network cannot viably support transmission of the content data at the  
7 actual transmission rate, receiving subsequent content file data at the first  
8 transmission rate; and

9 wherein the subsequent content file data is content file data that is  
10 transmitted after the limited portion of content file data has concluded  
11 transmission.

12  
13 **39.** The one or more computer-readable media as recited in claim 38,  
14 further comprising storing the actual rate in a history file associated with the  
15 server that contains one or more previous transmission rates at which content file  
16 data was adequately received from the server.

17  
18 **40.** The one or more computer-readable media as recited in claim 38,  
19 further comprising determining the first transmission rate from a history list  
20 associated with the server that contains one or more previous transmission rates at  
21 which content file data was adequately received from the server.

1           **41.**    The one or more computer-readable media as recited in claim 40,  
2 wherein the determining the first transmission rate from a history list further  
3 comprises determining a median rate included in the history list as the first  
4 transmission rate.

5  
6           **42.**    The one or more computer-readable media as recited in claim 38,  
7 further comprising calculating available network bandwidth to determine the first  
8 transmission rate.

9  
10          **43.**    The one or more computer-readable media as recited in claim 38,  
11 further comprising detecting when the transmission of the content file data at the  
12 actual transmission rate begins.

13  
14          **44.**    The one or more computer-readable media as recited in claim 38,  
15 wherein the limited portion of the content file data is specified as a number of  
16 seconds of transmission of content file data.

17  
18          **45.**    The one or more computer-readable media as recited in claim 38,  
19 wherein the limited portion of the content file data is specified as a number of  
20 bytes of content file data.

21  
22          **46.**    The one or more computer-readable media as recited in claim 38,  
23 wherein the limited portion of the content file data is specified as a number of data  
24 packets of content file data.

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1           **47.**    The one or more computer-readable media as recited in claim 38,  
2 wherein the actual transmission rate is a higher rate than the first transmission rate.

3  
4           **48.**    The one or more computer-readable media as recited in claim 38,  
5 wherein the actual transmission rate is a lower rate than the first transmission rate.

6  
7           **49.**    One or more computer-readable media containing computer-  
8 executable instructions that, when executed on a computer, perform the following  
9 steps:

10           transmitting content file data to a client over a network at a first  
11 transmission rate;

12           receiving a request from the client to transmit a limited portion of content  
13 file data to the client at a second transmission rate;

14           transmitting the limited portion of content file data to the client at the  
15 second transmission rate;

16           transmitting content file data subsequent to the limited portion of content  
17 file data to the client at the first transmission rate.

18  
19           **50.**    The one or more computer-readable media as recited in claim 49,  
20 further comprising identifying content file data transmitted at the actual  
21 transmission rate.

1           **51.**    The one or more computer-readable media as recited in claim 50,  
2 wherein the identifying further comprises flagging a first data packet of content  
3 file data transmitted at the second rate.

4  
5           **52.**    The one or more computer-readable media as recited in claim 50,  
6 wherein the identifying further comprises flagging each data packet of content file  
7 data transmitted at the second rate.

8  
9           **53.**    The one or more computer-readable media as recited in claim 50,  
10 wherein the identifying further comprises beginning transmission of the content  
11 file data at a specified time.